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NEW YORK, SATURDAY, OCT. 31, 1925

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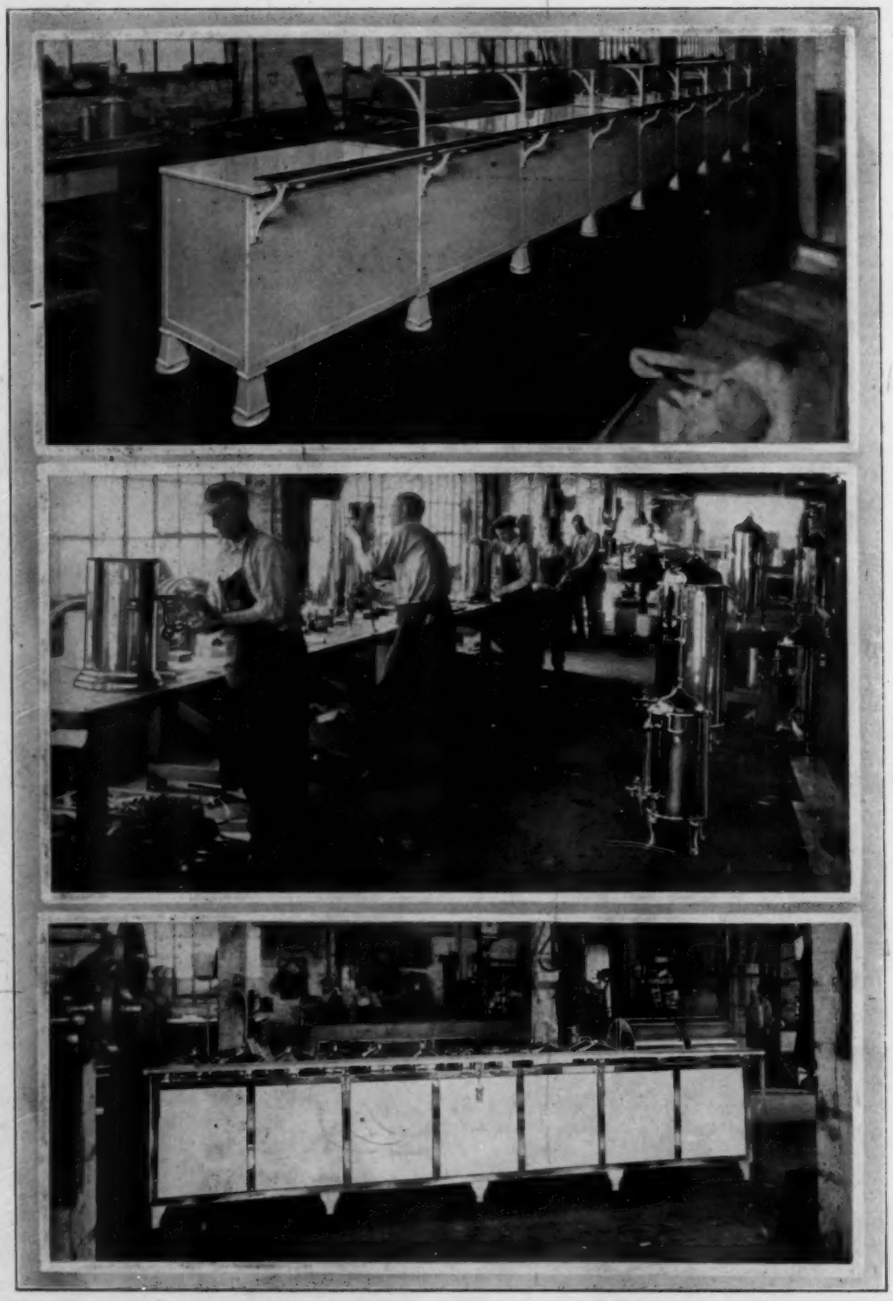

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SIXTY-SEVENTH YEAR

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Water Gas from Soft Coal

The effect of the blow run and air purge on the composition of carburetted water gas

L. J. Willien

Chemical Engineer, Charles H. Tenney & Co., Boston, Mass.

WHEN using bituminous coal in the manufacture of carburetted water gas it is necessary to use either the blow run or air purge or both in order to obtain the same capacity as with coke or anthracite coal. Practically all the data that has been published on the use of bituminous coal has dwelt on operating. Very little has been said about the effect which the blow run and air purge have on the composition of the finished gas or the composition of the gas made during the blow run and air purge period. The writer has collected considerable data on the latter phases, which are submitted in this article.

Effect of Blow Run and Air Purge on the Inerts and Specific Gravity

The use of the blow run or air purge or both increases the percentage of inerts in the finished gas and also its specific gravity. The extent to which the inerts and specific gravity are increased is dependent upon several factors, the principal ones of which are as follows:

(1) Length of blow run or air purge.
(2) Back pressure of the water gas machine.
(3) Blast pressure.
(4) Length of run.
(5) Taking the blow run or air purge out of the blow or run period.

Length of Blow Run or Air Purge

The inerts and specific gravity of the finished gas increases with an increase in the length of the blow run or air purge. Tables 1, 2, 3 and 5 show the effect on the inerts and specific gravity with a 10 and 15 second blow run and a 9 second air purge, using coke for generator fuel.

Back Pressure of the Water Gas Machine

I have no analyses showing the effect of back pressure on the inerts and specific gravity. Nevertheless, it is quite a factor because the amount of gas made during the blow run or air purge period will be practically proportional to the back pressure. Observations made on a 7 ft. 6 in. set with a tubular condenser between the outlet of the washbox and the relief holder showed that during the blow period air entered the base of the generator at the rate of 4,000 cu. ft. per minute and during a blow run it was reduced to 1,960 cu. ft., a little more than 50 per cent. In another case on a 6 ft. set where there was no condenser before the relief holder, the amount of air entering the base of the generator was 2,375 cu. ft. per minute during the blow and 2,100 cu. ft. during the blow run period, a reduction of about 12 per cent.

Blast Pressure

For any given blow run or air purge period the inerts and specific gravity will increase with the blast pressure. This is shown in Table 4. While the variation in blast pressure was not very great, an appreciable difference was found in the gas analyses.

Length of Run

Table 2 (columns 2 and 3) shows the results of using a 10 second blow run with a 4 and 5 minute run.

Taking the Blow Run or Air Purge Out of the Blow or Run Period

It makes quite a difference whether the blow run or air purge is taken out of the blow or the run period. If it is taken out of the blow period the inerts will be less than if it is taken out of the run. The effect is similar to increasing or decreasing the length

of the run period. Columns 3 and 4 in Table 5 show this very clearly. In fact, it seems to show it too clearly and may cause one to doubt the gas analyses. It may be said, however, that in every gas analysis made, a check was made on the nitrogen and in every case it checked within less than 1 per cent.

Table 6 shows analyses of gas from two different towns where both the air purge and blow run are used.

Blow Run and Air Purge With Coke

The blow run or air purge can be used just as well with coke or anthracite coal as with bituminous coal. Table 2 shows the results of some tests made with and without the blow run and air purge with coke as generator fuel. Tables 1 and 3 show the results of a test made with and without the blow run with coke. I have no figures on the air purge with bituminous coal, but with the blow run it seems that with the same length of blow run the inerts are a little higher when using coke than when using a mixture of bituminous coal and coke. The use of the blow run or air purge with coke or anthracite coal will reduce the generator fuel, increase the capacity, and also the oil per thousand. The increase in capacity with the blow run may in some cases be more than the amount of gas made during the blow run period. In one case that came under my observation where a 15 second blow run was used, there was an increase of 30 per cent in capacity, whereas it would be only 12 per cent if the increase were due only to the amount of blow run gas made. Apparently the blow run improved the conditions of the fuel bed so that more blue gas was made. Samples were taken of the blue gas made during the last minute of the run period with and without the blow run. The analyses of these samples are given in Table 7 and indicate that with the blow run more blue gas was made during the last minute of the run than without it. The apparent improvement in the fuel bed resulting from the blow run does not agree, however, with what really takes place as indicated by the composition of the blow run gas.

Composition of Blow Run and Air Purge Gas

One would naturally believe that the gas made during the blow run is a producer gas of the same quality as that made during the blow. And when using bituminous coal there would be some coal gas mixed with it. While it is true that producer gas is made during the blow run, it is of a much better quality than that made during the blow. Table 8 shows some analyses of the gas made during the blow and the blow run.

It will be noticed that the CO_2 in the gas made during the blow is much higher and the CO lower than in the gas made during the blow run. This is undoubtedly due to the velocity of the air through the fuel bed. This is at a maximum during the blow, with the result that a minimum amount of CO_2 is reduced to CO. With the stack valve closed when making a blow run, the velocity of the air is reduced, due to the back pressure of the washbox, relief holder, etc., the result being that a much larger portion of the CO_2 is reduced to CO. It is this fact which does not agree with the previous statement about blow run improving the conditions of the fuel bed. The reduction of CO_2 to CO is accomplished by an absorption of heat, so therefore the blow run would have a tendency to reduce the temperature of the fuel bed rather than increase it.

Table 9 shows composition of blow run and air purge gas made when using coke. The composition of the air purge gas shows clearly the effect of purging the set of the blue gas and oil gas which is in it at the end of the run and which in ordinary operation is blown out through the stack.

One very interesting thing about these analyses is the amount of oxygen found, which shows that practically all of the oxygen in the air entering the base of the generator is consumed. Many have the idea that when using the blow run or air purge, air is blown over into the relief holder. This idea is wrong, because the amount of free air in the blow run or air purge gas is practically nil.

Blow Run Versus Air Purge

The analyses of the blow run and air purge gas as shown in Table 9 indicate that it is better to use the air purge than the blow run. The enrichment of the air purge gas by the blue gas and oil gas should have a tendency to reduce the additional

(Continued on page 516)

The Newspaper Contact *

How it is accomplished--what is its value

Joe Carmichael

Director of the Iowa Committee on Public Utility Information

THE newspaper is the principal medium for the circulation of facts and figures and ideas, from a consideration of which the 120,000,000 people of this country form what is known as public opinion.

It is important, therefore, that the public utility companies use this vehicle for maintaining a close contact with the public. One of the means by which they are trying to accomplish this is the Committee on Public Utility Information.

Probably every committee at the time of its organization was confronted with the same serious obstacle, the rankling antipathy with which newspaper men greet the press agent with his plethora of literature.

The committee had to impress on the newspaper men the importance, from a news point of view, of the industries which it represented, and the absolute necessity for a more sane and comprehensive knowledge of the public utility business.

Purpose of Organization

They were not, as some others, organized to get free space to advertise a particular make of automobile, or to get more people to attend a theatrical or other amusement performance, or to promote the political ambitions of some individual or party.

Nor were they organized to sell more gas or telephone service, or electrical energy, or to get more people to ride on the street cars.

They were organized to make people realize that public co-operation is absolutely necessary if good, dependable public utility service is to be furnished by the public utilities, and that without this kind of service the nation cannot advance industrially and socially.

First, therefore, they must win the confidence of the newspapers to whom are entrusted the duty of conveying the news to the public.

Only News Sent Out

The newspapers had to be shown that they were being asked only to print news and that whatever there was in the nature of advertising or plain propaganda would be placed in the advertising columns and paid for.

And the utilities are playing fair with the newspapers in this respect. In our state practically every one of the larger utility companies and most of the smaller ones advertise constantly and consistently their securities, and supplement these with an explanation of their organization and their problems.

When publishers understand that utilities are not asking something for nothing, but expect to pay for legitimate service, a firm foundation has been established on which to establish a cordial contact with the men who direct the channels through which news flows.

The old press agent stunt of inviting the reporters down to the corner saloon, getting them tanked up, taking them out to dinner and filling their pockets with complimentary tickets, or making them a present of a box of cigars or a bottle of Scotch on their birthdays or at Christmas, and remembering the new baby with a silver cup and the Mrs. with a gas percolator, doesn't go any more—that is, not far.

If it were effective it would be cheap. But it is growing less effective daily.

Real Business Proposition

These committees have a real business proposition to make to the newspapers.

The papers want news. They want every avenue opened to them so that they can secure the news expeditiously and correctly.

They want to know of someone to whom they can go for corroboration of a story and get quick action.

They want, also, to know of places where they can go for feature stories, interesting and novel, probably just on the verge of news, but which the people read with interest and which constitute a part of every newspaper's offering to its readers.

And they want to know that the source is reliable, that is, that the facts will be given and nothing but the facts.

This spirit of confidence spreads among newspaper men. They have their conventions and conferences just as we do in the utility business. And they always discuss the press bureau, no matter what else the conference may have been called to discuss.

And when you get to the point where, after damning the press agents for two hours and resolving against them and promising not to publish a line of their stuff, they will say, "But this utility information bureau is all right. They play the game squarely," you have arrived somewhere.

Serving the Newspaper

How can the public utility information bureau be of service to the newspaper?

There are many ways.

In handling conventions, the committee can get advance copies of papers to be read and addresses to be made and hand them to the newspapers, so that the editors and reporters can read them at their leisure and dig out the matter in which they think the public will be interested and have it ready for publication on the day the paper or address is de-

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*Delivered at the Wednesday Meeting, the Publicity and Advertising Section, A. G. A. Convention, Atlantic City, N. J., October, 1925.

Gas Hot Water Heaters for the Fall

Description of some attractive advertisements and window displays

W. B. Stoddard

IN many sections of the country winter does not really set in before December, and is only a few months long at the most, but there is a long spring and autumn, when one does not want to keep the furnace going, and yet the comfort of hot water for bathing is felt very keenly. These, then, are the seasons to push most energetically the gas hot water heaters.

The Honolulu Gas Co., Honolulu, T. H., have taken up this matter most effectively. They advertise every week in the year, and their ads are always signed "The Gas Man." They always inject human interest into their ads and endeavor to have them timely. For example, after the heat of summer, they feature their hot water heaters. A couple of these ads will show in what a practical manner they appeal to the householder:

"HOT WATER

"When you roll out of bed these crisp mornings, don't you long for a little hot water to take the edge off your cold shower? Somehow that stinging shower doesn't hold the same appeal for you it did last August.

"And shaving with cold water this time of year is an unpleasant task. You can get hot water by heating it in the tea kettle, but that's a nuisance.

"As for the woman of the house, there's no time of the year when she doesn't need hot water—for washing clothes and dishes, for her scrubbing and daily bath.

"It's easy to have hot water any time and all the time. All you need is one of our automatic gas water heaters. The price is moderate, the cost of operation negligible, and the comfort and convenience is continuous.

"If you place your order with us now for a water heater, we can install it immediately.

"The Gas Man."

"YOUR BATH WAS A BIT SHIVERY THIS MORNING, EH?

"Strange how a cold shower can make one shudder and yell at this time of year, even in Hawaii's sub-tropical climate, isn't it? We stand and look at the shower bath and dread to turn the water on. Finally we step under, turn the faucet and gasp, even before the water hits us.

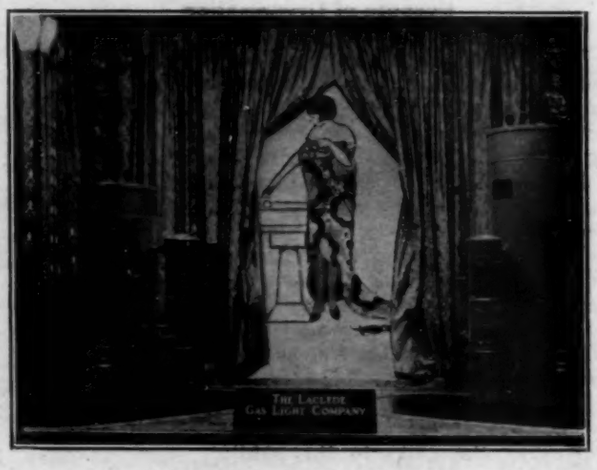
"A cold shower is good—but not too cold. It should be tempered to the shorn lamb—meaning us.

"That's easy to do. Install one of our automatic hot water heaters and you can have your bath just the right temperature. The first cost of a water heater is reasonable and the cost of operation is negligible. Get one now, and don't yell so that the neighbors send in a riot call whenever you take a bath.

"The Gas Man."

The Water Heater at Expositions

Many expositions of various kinds are held in the fall, and this is an excellent chance to present the advantages of the gas water heater. One of the best along this line was that of the Counties Gas Co., Norristown, Pa., who at their booth had two practical demonstrations of the low cost and efficiency of these heaters. The first contained a group of every-day articles which people buy with little thought of cost. In the centre was a glass tank



A Window Display That Interests

representing the amount of water which may be heated for three cents a day. Surrounding it were three sticks of gum, three Camel cigarettes, half a 5c cigar, one egg, one apple, a three-cent stamp, all of which could be dispensed with with far less inconvenience than hot water. The other display was even more striking and met the argument of the man who contends that a coal fired water heater is cheaper than gas. Suspended from a tripod was a bucket of coal, and cards showed how much it took to heat water per day at various prices per ton to say nothing of the disadvantages of having to build a fire for this purpose.

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Internal Corrosion of Holders

What happens and how it may be prevented

Dr. Richard Engler

(The corrosion question is one that concerns not only the gas industry but all industry in general. Whatever metal is employed, particularly iron and steel, the problem of corrosion and protection against corrosive elements exists. There is a continual struggle between Nature and man, natural laws controlling the corrosion of metal and man endeavoring to circumvent the natural laws by covering the corrosible metal with protection of one sort or another. In the gas industry corrosion is an important matter and particularly so with regard to the gas holder. It has generally been held that the corrosion of the gas holder is mostly external and the well-painted holders in the gas works throughout the country are indicative of the fact that the gas man has taken careful cognizance of this problem and is constantly on the lookout to prevent corrosion. However, recent articles in this and other trade papers and technical journals have shown that there is some corrosion as well of the internal metallic surface of the holder. What this corrosion is, how it takes place, the nature of its chemistry and a suggested method for its prevention are discussed in the following article by a prominent German gas engineer. The article appeared originally in Das Gas und Wasserfach.—Trans.)

IN Germany coal gas has been mixed with water gas, and even producer gas, due to the fact that supplies of gas coal were scarce with resulting increase in the price of the fuel, making it necessary to use lower grade fuels in the manufacture of gas. Many gas works have also adopted the practice of removing the benzol from the coal gas, and as a result of this practice it was soon noticed that the gas was having a marked destructive action on holders and meters. It is believed that when the fatty hydrocarbons are allowed to remain in the coal gas they exert a protective action on the metal with which the gas comes in contact. It was also observed that the greater the portion of water gas mixed with the coal gas the greater the corrosive action of the mixed gas on the metal of the holder.

Causes of Corrosion and Its Chemistry

The question now arises, what are the causes of the corrosion of the metal of the holder by the gas and what is the exact nature of the chemistry of the process? A study of this aspect of the problem is very important, for it is a fact that an enemy can be combatted the more successfully, the better one knows his shortcomings and his capability for doing harm. Where oxygen and moisture exist, there iron cannot exist in the unprotected condition. There is not a very large proportion of oxygen in the gas space within the holder and in the holder water, but, on the other hand, there is plenty of moisture present both in the gas and in the holder space, with the result that, particularly where the holder water contains salts in solution, small quantities of oxygen are able to effect a very harmful action on the metal. There is no gainsaying the fact that the problem of corrosion is of paramount importance to everyone and, on the other hand, just as important as it is, so little understood and appreciated is the chemical and physical mechanism of the rusting process.

It has been a far road from the so-called carbon dioxide theory to the electrolytic theory of rusting and to the newer theory of this important chemical process which is based on the newest development in chemistry, colloid chemistry. Rust is commonly understood to be the yellowish red to black red substance, which according to its chemical composition is considered as a ferric oxide with varying amounts of chemically combined water. In general the formula of rust has been written $Fe_2O_3.(H_2O)$.

Theories of Rusting

Formerly the formation of rust has been said to be due to the simple action of oxygen on iron. Later it was recognized that the presence of water was also of importance in the rusting of iron and that moisture was essential in this process. Then the theory went one step further and stated that the presence of carbon dioxide is also essential, which substance is present in greater or lesser proportions in all natural waters and in the atmosphere as well. According to the carbon dioxide theory, the phenomenon of rusting occurred according to the following equations:

$$Fe + CO_2 + H_2O = FeCO_3 + H_2$$

$$4FeCO_3 + 6H_2O + O = 2Fe_2O_3(H_2O)_6 + 4CO_2$$

Carbonate Formed as Intermediate Product

It is thus seen that the carbonate of iron is an intermediate product in the rusting process, and that the action of the oxygen in the air is to set free the carbon dioxide and convert the carbonate into the oxide of iron. Therefore, it would follow that one and the same mass of carbon dioxide would be able to convert new iron continually into iron rust. This would appear to explain in a rather handy manner the continuity of the rusting process, after the first signs of rusting appear.

On the other hand, various investigations that

were carried out by English scientists have shown that only oxygen and moisture need be present to bring about the rusting of iron. In other words, they have shown by experiments which are scientifically accurate that the rusting of iron can be accomplished in an atmosphere which is entirely free from carbon dioxide. There is hardly any doubt that the presence of carbon dioxide in the atmosphere enhances the rusting process, and particularly is this true in the case of coal-water gas mixtures in which the percentage of carbon dioxide gas is just right for this purpose. This also applies to the case of water gas alone. The decomposition of the iron under these conditions is greatly accelerated.

The Peroxide Theory

The peroxide theory is also one of interest. According to this theory the formation of iron rust is started first by the formation of ferrous oxide and hydrogen peroxide and then the latter attacks the iron still further and also oxidizes the ferrous oxide into the ferric oxide. The mechanism of the rusting process according to this theory is seen from the following equations:

$$Fe + O_2 + H_2O = FeO + H_2O_2$$
$$Fe + H_2O_2 = FeO + H_2O$$
$$FeO + H_2O_2 = Fe_2O_3(H_2O).$$

However, it has been found that hydrogen peroxide, which is formed by the oxidation of metallic zinc in the presence of water, does not form when iron is treated in the same manner. Experiments have proven the truth of this statement. There does not appear to be any good reason to believe that the rusting of iron is accomplished in accordance with the hydrogen peroxide theory, for not only will iron not oxidize with the formation of peroxide but many other metals behave in exactly the same manner.

The Electrochemical Theory

In contradistinction to the foregoing theories which have been based on pure chemical principles only, the modern theory of rusting makes use of the principles of electrochemistry. Physical chemistry has been called in as an aid in explaining rusting and physical laws as well as chemical laws have been demonstrated to be involved in the process.

Thus Dunstan has shown that when iron is allowed to remain in moist air, as long as the temperature does not vary, the metal will not rust. On the other hand, just as soon as the temperature is lowered so that the water vapor is condensed and is deposited as a thin watery film on the metal, rusting sets in. Water acts as the electrolyte in which the iron, due to its solution tension, sends out ions, electro-positively charged particles, and in this manner it itself loses electronegative charges. The mechanism of this process is shown in the following equation:

$$Fe + 2H_2O = Fe(OH)_2 + H_2$$
$$Fe + 2H^+ = Fe^{++}H_2.$$

The quantity of cathions found in the water is small, as the osmotic pressure of the ions at once opposes the solution pressure, the tendency then is for the iron to precipitate. An equilibrium sets in which is characterized by the fact that just as many ferrous ions are precipitated on the iron as the latter sends into the electrolyte. Furthermore, a difference in potential occurs at the limiting surface between the metal and the solution.

The ferrous ions disappear from the solution and then the equilibrium is disturbed and the iron again emits ions which go into solution in the electrolyte. This disturbance is brought about by the oxidation of the ferrous hydroxide to ferric hydroxide, which is rust.

Impurities in the Iron

Another factor is the presence of various impurities in the iron, such as carbon, silicon, manganese, etc. These substances have the effect of forming couples which result in local currents being set up in the mass of iron and the destruction of the metal is accordingly accelerated. When the water with which the metal comes in contact contains salts in solution, then the electrical effect is increased and the solution of the iron is accelerated.

Another step which has been made in the study of the mechanism of the rusting of iron is to consider the electrolytic process from the colloid chemical standpoint. Colloidal hydroxide of iron is said to be formed on the surface of the metal in the course of its oxidation, and because of the large surface area of this colloidal hydroxide it absorbs the positive ions which are present in the electrolyte. In this manner it itself becomes positively charged. As long as diffusion does not take place, the hydroxide is precipitated as a protective layer over the surface of the metal and further rusting of the metal is prevented. But just as soon as diffusion occurs, then the positively charged hydroxide is precipitated by the anions which are found in the solution, while the negatively charged metal is neutralized by the cathions. Then the metal, according to its solution pressure, can send out positively charged ions once more into solution and the action begins once again.

Action of Sulphuretted Hydrogen

Another constituent of gas which has a harmful action on the unprotected metal of the holder walls is sulphuretted hydrogen. Although this gas is present in very small proportions only in most purified gases, nevertheless the amount of sulphuretted hydrogen with which the holder walls can come in contact during the period of one year's operation can be so large that it must not be overlooked entirely as a corrosive agent. Sulphuretted hydrogen, as a weak acid in water solution, attacks the iron with the formation of sulphide of iron, which is converted into the sulphate of iron by the action of the oxygen that is found in the holder water or in the gases themselves. This substance is soluble

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As The Journal Views It

GAS PROSPERITY

Much has been said about the progress and development that are taking place in the gas industry, and promises that the future has for it. Many discussions have been held on the manner in which future accomplishments in the gas industry will be effected. Gas men have been considering and studying for quite some time the great potentialities of the gas industry and the position it will eventually hold in the industrial life of the nation.

Perhaps not enough attention has been given to the fact that the gas industry has arrived and that real gas prosperity is at hand. It may not be so well realized that we have passed through an extended period of development, and that we have now attained such a position that we can truly say that real progress has been made and that gas prosperity is at hand.

To some of us this may appear too optimistic, for we have not quite gotten over the strenuous efforts that have been made during the past decade, in the endeavor to overcome the retarding effect that was produced by the loss of the lighting load to electricity. Many of us have still not entirely recovered from this loss. But, as a whole, the gas industry has progressed most wonderfully since that epoch in its history.

It must now be held that many of the ends that the gas industry has set for itself have been achieved. Of course, it is true that we have not yet advanced to the final stage of our development, but it is well for the gas man to realize that certain of the goals that he has set out for himself have been reached. Thus, for example, house heating business is now well established in certain localities and is growing rapidly in others. The industrial end of our business has undergone remarkable progress. The industrial load is increasing practically everywhere. Furthermore, the domestic customer is using more gas than ever before, not only for cooking purposes, but also for space heating and for various other uses in the home laundry. The financial status of the gas industry is better now than it has ever been and our relations with the public are constantly being improved. It is also possible to see an improvement in the rate question. All in all, the gas industry is at present in a very good condition and the horizon looks clear for future developments.

There should no longer be any doubt in the gas man's mind as to the future of gas. It is no longer a matter of idle speculation. The public itself, by the interest it has shown in gas company securities, has demonstrated its faith in the gas industry. Today we may well review our efforts, look back upon what they have produced and fearlessly make the necessary changes in them, so that they may bear even greater fruit in the future. Gas men can now proceed with full confidence that they are capable of accomplishing the tasks of the future, for their success in the past has definitely shown them that when they really put their shoulders to the wheel they are able to make real progress in pushing their industry along the road to progress.

Of course, this should not develop in us a feeling of over-confidence. There is still a long road to travel before eventual success will be attained. There are still many obstacles to be overcome; there is still many a mile-post to be passed, but it is nevertheless true that our industry has gone through its preparatory stage and has attained initial success in practically all its fields of operation. Gas is today a prosperous industry, an industry which is well on its way toward the attainment of its ultimate goal—the use of gaseous fuel wherever heat is required.

PEOPLE THEMSELVES NOW OWN PUBLIC UTILITIES

One family in ten owns shares in electric, telephone or gas companies, in the United States. And a more significant statement is made, after a national survey, that the average holdings of utility stocks amount to less than ten shares per individual. This fact is argued as conclusive proof that the ownership of public utilities is vested in the average citizen.

GAS HOT WATER HEATER FOR FALL

(Continued from page 508)

Value of a Good Window Display

A good window display will also go a long ways towards interesting people in these gas heaters. The Laclede Gas Light Company, St. Louis, Mo., under the direction of S. C. Rieser, display manager, prepared a handsome series of windows, setting forth their gas appliances. In featuring their gas heaters they showed a window with curtains of buff and gold silk, drawn back to reveal a sketch of a portion of a bathroom and life-size figure of a young woman, in flowered bathrobe, turning the faucet. In front of the curtains, at each side, were tanks and gas water heaters. During a special sale of these heaters—lasting one month—they were offered at $5

A Window Display Featuring Thermostatic Control

down and $1 a month. One art card of black lettered in white and gold told of the special advantages of this heater, and another said:

"NOTHING SO INVIGORATING THIS KIND OF WEATHER AS A GOOD BATH OF WARM WATER

"Relaxes you and cleanses the skin, and a splash of cold water at the end makes you feel like new. "All the warm water you want, whenever you want it, with this automatic gas heater."

Emphasis on Thermostat Control

The Peoples Gas Stores, Chicago, likewise featured heaters, with special stress on the thermostat control. As in the case of the St. Louis company, the display was backed with silk curtains, with garlands of morning glories at the top. Two tanks and water heaters were displayed and also beside one of them the thermostat control. A card at the base of the pillar advised: "This is the automatic control to be placed on the wall of the bath room or kitchen," while a larger card said:

"HERE IS HOW IT WORKS

"The clock control runs from five to sixty minutes. If it takes twenty minutes to heat the quantity of water you need, set the hand at twenty and turn to the 'on' position. When the required amount of water is hot the gas automatically shuts off. A cable runs from the thermostat showing the connection between the control clock and the gas valve."

In front was shown a plan of installation, and a big card said:

"INSTALL THIS CLOCK CONTROL

in your bathroom. It automatically starts and stops the flow."

A Little Fun in a Window Display

"A little nonsense now and then is relished by the best of men," and when it serves to call attention to one's line it can be used to good effect. Such was the display of the Portland Gas Co., Portland, Ore. Against a background of red curtains were shown a water tank painted white and a gas heater painted black. The tank had a ribbon tied around it near the top, and above the ribbon painted features giving it the rude semblance of a person. Features were also painted on the heater, and it was topped with a red cap. A card beside them said:

"PALS

"Let Big Tank and Little Gas Heater provide you with an abundance of hot water this fall."

Another card gave practical information as to how installation could be made and the heater secured on deferred payments, with a small payment down. Outside the window was a little metal pocket filled with pamphlets pricing and describing the different types of tanks and gas heaters, and the terms on which they could be secured. A card above the rack invited "Take One."

HEATING AND VENTILATING ENGINEER'S GUIDE

The American Society of Heating and Ventilating Engineers has just issued "The Heating and Ventilating Engineer's Guide from 1925 to 1926." This volume contains information on design and specification data useful in the planning and construction of modern heating and ventilating installations. The material contained in the book is derived mostly from the transactions of the society, investigations of its research laboratory and the practical experiences of its members. The book is profusely illustrated with tables and figures and contains very valuable data on all matters relating to heating and ventilating installations.

The latter part of the book contains a manufacturer's catalog section, giving the essential and reliable facts concerning modern equipment. There is also a consulting service section with a directory of engineers specializing in heating and ventilating work. At the end of the book there is a list of the members of the society.

INDUSTRIAL GAS LESSONS

IF IT'S DONE WITH HEAT YOU CAN DO IT BETTER WITH GAS

Lesson No. 92

Heat and Change of State

REFRIGERATION

A few words must be said regarding the principles of refrigeration, as gas appears to be entering that field as well as the heating field. Of course, the use of gas in refrigeration is simply to produce heat and cause the evaporation of a liquid.

In the regular ammonia system of refrigeration, the freezer or air-tight vessel contains liquid ammonia. Ammonia vapors are allowed to come in contact with a vessel which contains water. The latter absorbs ammonia freely and the rate of evaporation of the liquid ammonia is so great that the temperature of the water in vessels surrounding the freezer can be readily reduced to the freezing point. When the water which has absorbed the ammonia is fairly saturated with it, it is pumped back into boilers, heated by gas, which effects the removal of the gas from the water. The ammonia is then condensed again and returned to the freezer. The process is made continuous in this manner.

Various Refrigerants Used

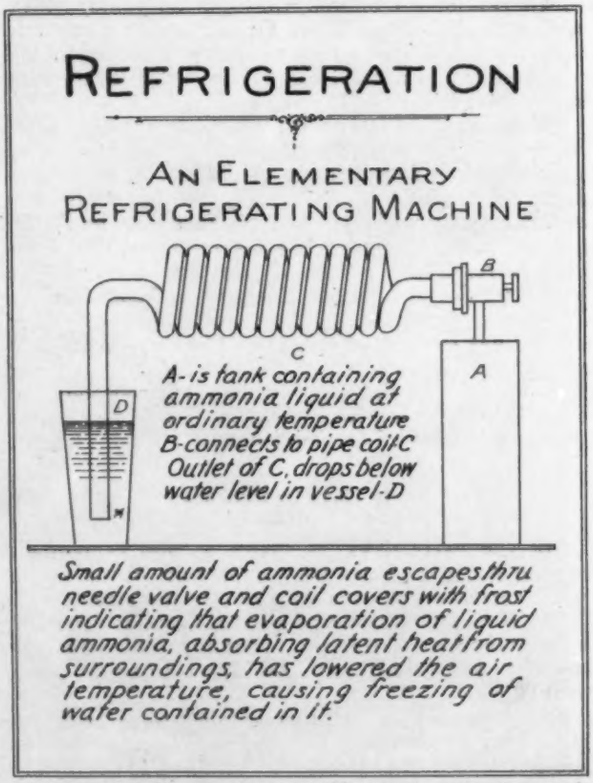
As is known, the production of cold and the freezing of water to manufacture artificial ice are carried out in other ways as well. Various other substances are employed in the process, but the principle of these processes remains intrinsically the same. Advantage is taken of the fact that in the change from the liquid to the gaseous condition a great amount of heat is absorbed by the substance without any lowering in the temperature, and this heat, the latent heat of evaporation, must be taken from the surrounding substances, with the result that their temperature is reduced to such a point that freezing takes place. This process is known simply as producing cold by evaporation.

It must also be pointed out that the temperature of a gas is materially reduced as well by allowing it to expand rapidly after being compressed. The work that is done by the gas in expanding has the effect of reducing its temperature. The air system of refrigeration is based on this principle.

A good example of the effect of rapid evaporation of a liquid is seen in the case of liquid carbon dioxide. When this liquefied gas, which is contained in a steel cylinder, is allowed to escape from the nozzle into the free air, the evaporation of the liquid takes place at so great a speed and the temperature of the issuing substances is lowered to such a degree that it is frozen and carbon dioxide snow is obtained, which has a temperature of minus 79.2 degrees C. below zero.

Evaporation of Solids

Under certain conditions, not only liquids, but solids evaporate as well. Of course, in this case the rate of evaporation is much slower. The direct change from the solid to the liquid condition is known as sublimation. Thus the carbon dioxide snow, mentioned above, will go directly from the solid to the gaseous condition. Ice itself will evaporate, changing directly into vapor without first liquefying. However, the first notice that we have of a substance subliming is through the sense of smell. This is, however, only an indirect proof of the fact that the substance has gone directly from the solid to the gaseous state.


REFRIGERATION
AN ELEMENTARY REFRIGERATING MACHINE
B
C
A
D
A-is tank containing ammonia liquid at ordinary temperature
B-connects to pipe coil C
Outlet of C, drops below water level in vessel-D
Small amount of ammonia escapes thru needle valve and coil covers with frost indicating that evaporation of liquid ammonia, absorbing latent heat from surroundings, has lowered the air temperature, causing freezing of water contained in it.

Brooklyn Union Honors Old Timers

Nine gas men over fifty years in service--300 over 25 years

AT the Thirteenth Regiment Armory on Wednesday night, October 21, the Brooklyn Union Gas Company honored more than 300 of its employees by presenting them with service emblems for continuous service of from 25 to more than 60 years.

Preceding the presentation ceremonies, the honor men assembled in the Memorial Hall of the armory, where a dinner was given them, at which J. T. White, assistant secretary, presided. At the conclusion of the dinner Mr. White introduced Clifford E. Paige, vice-president of the Brooklyn Union Gas Company, who made the address of welcome.

Mr. Paige Addresses Meeting

In opening, Mr. Paige stressed the fact that this was Service Emblem Night for the Brooklyn Union Gas Company, and especially so for the honor men, who, by the extraordinary length of their service, made the occasion possible.

"In fact," continued Mr. Paige, "it is this service which you have rendered, through the years, which makes the Brooklyn Union Gas Company what it is today, a monument to its creators, a credit to the community and a good example to other companies in our vast industry.

"It is a vast industry with which we are identified, representing in this country alone an investment of approximately four billions of dollars. The 'manufactured' gas industry operates over 1,000 companies in this country. With gas supply furnished by 70,000 miles of main, through 10,000,000 meters, 10,000 families representing 50,000,000 persons are provided with a service, continuous, adequate and satisfactory. This great development came about because people needed gas service. Companies like ours planned it and people like you made it a fact. And remember that today sees the gas business with an outlook even brighter than any prospect it has had in its glorious century of accomplishment.

Early Days in Brooklyn

"In the early days, as many of you remember, several gas companies were supplying Brooklyn, in some cases having parallel mains in the streets.

"In 1895 that illustrious citizen, General Jourdan, a man whom you all knew, brought these companies together and formed the Brooklyn Union Gas Company.

"Since that time other companies have been acquired in the outlying sections and now operate as subsidaries of the Brooklyn Union Gas Company system.

"This enormous business constitutes the third largest gas company in the United States, being outranked only by New York and Chicago.

"It is probably true that the territory supplied by the Public Service Company of New Jersey and the City of Los Angeles, California, is as large as ours, but in both cases the territory is not entirely served by one company, and they are not engaged exclusively in the gas business.

James H. Jourdan President for 45 Years

"It took men of exceptional ability and unusual courage to organize the Brooklyn Union Gas Company and to start it on its way. It took just as much care and skill to guide the ship after it was launched.

"All business must have a head, all ships must have captains. The remarkably successful voyage of this great ship is in very great measure due to the inspiring leadership of one of the finest characters in business—our president, Mr. James H. Jourdan.

"I shall not dwell at length on Mr. Jourdan's qualities and attributes. To do so would be to give you nothing that you do not already know and appreciate and would be distasteful to one in whom modesty is such a predominant characteristic.

"He is a man highly regarded throughout our industry and a pillar in that civic structure which we know as the city of Brooklyn.

"A large ship cannot be handled by one man, nor, indeed, by one officer.

"In this long voyage, covering a period of more than 45 years, in itself a wonderful record, Mr. Jourdan has had a first mate, a keen, shrewd, kindly man, just the sort of man most needed for such an enterprise. All through the years this man stood watch with the president. Always ready, never obtrusive, he has given invaluable aid in the navigation of our ship. I am proud of the friendship of Mr. Arthur Staniford. An example to many, a friend to all, his record stands high in our honor roll.

"And so I might go on giving attention and tribute to all of the officers. They are worthy of it.

The Rank and File

"But where would the officers be without the crew? The machinery fails to operate and the ship becomes a derelict.

"It must be a wonderful satisfaction to feel as you gentlemen should feel. The satisfaction of a service well performed, a job well done, there is no doubt that life's greatest rewards are in keeping faith with one's conscience and doing well each day the appointed task.

"I should like, if time permitted, to tell you something of the record of each man here. Some men have opportunities which make their deeds conspicuous; all of you have records of proud achievement.

"It is, perhaps, selfish of me to speak of myself. It is my first opportunity to greet so large and so representative a group of the Brooklyn Union family. May I tell you that I heard of the exceptional spirit of friendship and loyalty which is the atmosphere of this company? I came a stranger, but by your unfailing kindness and courtesy you have

(Continued on page 518)

Brooklyn Union Gas Company
Frank J. McIntyre
60 Years Service
James Clarke
54 Years Service
Michael H. Maloney
57 Years Service
James H. Jourdan
President
Arthur F. Staniford
Vice-President
42 Years Service
42 Years Service
Thomas F. Roach
53 Years Service
Michael J. Shay
53 Years Service
Edward J. Byrne—Supt.
54 Years Service
Bart W. Kotchie
52 Years Service
Patrick J. McIntyre
54 Years Service
Edward R. Du Cret
58 Years Service
Semper Fidelis

WATER GAS FROM SOFT COAL

(Continued from page 506)

amount of oil required to enrich the blow run or air purge gas.

Effect of Bituminous Coal on the Inerts

The question has been raised of the nitrogen in the bituminous coal increasing the nitrogen in the gas. I have no data on the relative amounts of nitrogen in bituminous coal, coke or anthracite. Table 10 shows the analyses of gas made with coke, anthracite and mixtures of bituminous coal with coke and anthracite without using the blow run or air purge. The analyses show that the bituminous coal does not cause any material increase in the nitrogen content of the gas.

Rate of Carbonization of Bituminous Coal in a Water Gas Generator

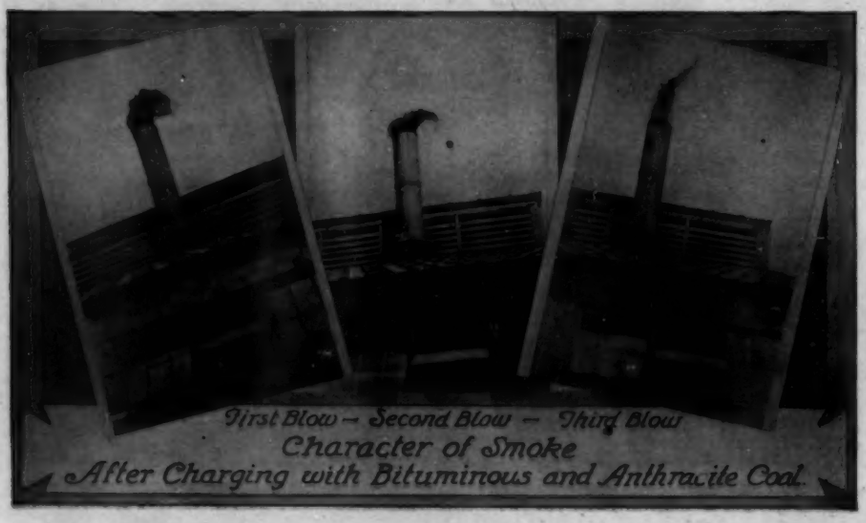
Table 11 shows the analyses of gas samples taken from the top of the washbox on the 1st, 2nd, 3rd, 4th and 6th run after putting a charge of bituminous coal in the generator of a water gas set. The coal was charged on a hot fire or after blowing. There is also an analysis of a sample taken during the first run after charging bituminous coal during which no oil was introduced. None of these samples includes any of the blow run gas. These analyses indicate that the maximum amount of coal gas was given off during the second and third run. This conclusion was reached on the basis of the percentage of illuminants and methane found in the gas.

Production of Smoke When Using Bituminous Coal

One objection to bituminous coal is the amount of smoke made. Practically all the smoke is made when going from the run to the blow. When putting on the blow there is a short interval between opening the generator and carburettor blast valves and the time when the gases ignite in the carburettor. It is during this interval that the smoke blows out through the stack. It is worse on the first blow after charging bituminous coal and gradually decreases with each succeeding blow. If a mixture of bituminous coal and coke or anthracite is used and they are charged intermittently there will be very little if any smoke on the blows made after charging the coke or anthracite.

Using a mixture of bituminous coal and anthracite produces much less smoke than a mixture of bituminous coal and coke. This is shown by the photographs.

The production of smoke can be practically eliminated. The main thing is to ignite the gases in the carburettor as soon as possible when putting on a blow. With a hand operated set this can be accomplished best by opening the generator blast valve part way (one-quarter to one-third), then open the carburettor blast valve. The gases in the carburettor will ignite almost instantly. Then the generator blast valve can be opened full. This procedure cannot be followed with a set equipped with automatic or hydraulic control, neither is it necessary to use it when using a mixture of bituminous coal and anthracite.



First Blow — Second Blow — Third Blow
Character of Smoke
After Charging with Bituminous and Anthracite Coal.

Conclusions

1. When using coke or anthracite coal for generator fuel it is better to use the air purge than the blow run because of the added enrichment by the blue gas and oil gas in the carburettor and superheater at the end of the run. The same should be true when using bituminous coal, although no data has been collected to prove it.
2. When using the blow run or air purge they should be taken out of the "blow" period instead of the "run" in order to keep the inerts to a minimum.
3. When using coke or anthracite the blow run period should not be more than 10 seconds with a 4 minute run or 15 seconds with a 5 minute run.
4. When using a mixture of bituminous coal and coke or anthracite, a 15 second blow run with a 4 minute run is about the limit that should be used.
5. The inerts should not be allowed to go over 20 per cent and the specific gravity should not go over .70. The specific gravity of a 540 B.t.u. water gas will run about .65. Increasing it to .70 should not cause any trouble with gas burners adjusted for gas having a specific gravity of .65.

6. Gas makers should be watched closely when using the blow run or air purge to keep them from stealing on the blow run or air purge. Once the gas makers learn that the blow run or air purge increases the make they are apt to steal on the time in order to fill the holders more quickly.

7. The simplest way to keep a check on the inerts or specific gravity is to determine the specific gravity of the gas. The best and cheapest apparatus for testing the specific gravity of gas is the Hinman Jenkins apparatus. The apparatus, together with a stop watch, costs about $30. Anyone that can operate a calorimeter can determine the specific gravity, for the test is not difficult or complicated.

8. The composition of the gas made during a blow run or air purge is entirely different from the gas made during the blow. The blow run gas is lower in CO_2 and higher in CO. The air purge gas is richer than the blow run gas because of the blue gas and oil gas in the water gas machine at the end of the run.

9. Less smoke is made when using a mixture of bituminous coal and anthracite than when using a mixture of bituminous coal and coke. When using the latter, smoke can be practically eliminated with a hand operated set by using the method described under "Production of Smoke When Using Bituminous Coal."

10. The maximum amount of coal gas is generated from bituminous coal during the second and third run after charging the bituminous coal.

Table 1—Composition of Gas Made With and Without Blow Run—7 ft. 6 in. Set

CO_2	4.7	3.7	3.7
Ills.	9.2	8.0	9.5
O	.7	.4	.5
CO	33.0	29.5	28.9
CH_4	14.0	12.5	16.0
H	33.0	24.1	28.9
N	5.4	21.8	12.5
Inerts	10.8	25.9	16.7
Sp. Gr.	.671	.748	.695
Blow	3'	3'	3'
Blow run		15"	10"
Run	5'	4'-45"	4'-50"
Fuel	Coke	Coke	Coke

Table 2—Composition of Gas Made With and Without Blow Run and Air Purge—Coke Generator Fuel—6 ft. 0 in. Set

CO_2	4.8	4.9	4.3	4.1
Ills.	8.8	8.3	8.5	8.4
O_2	.9	1.3	1.2	1.1
CO	30.1	31.1	27.3	33.6
CH_4	12.9	11.9	12.3	12.9
H	28.8	29.2	27.8	35.8
N	13.8	13.3	18.6	4.1
Inerts	19.5	19.5	24.1	9.3
Sp. Gr.	.714	.716	.720	.645
Blow	1'-53"	2'-50"	1'-50"	2'
Blow-run		10"	10"	
Air Purge	7"			
Run	4'	5'	4'	4'
Fuel	Coke	Coke	Coke	Coke

Table 3—Composition of Gas Made With and Without 10 Second Blow Run With Coke and a 20 Second Blow Run With a Mixture of Bituminous Coal and Coke—5 ft. Set With Back Run

CO_2	5.7	5.3	5.8
Ills.	8.1	7.9	8.5
O_2	.7	.9	1.1
CO	31.2	28.4	25.1
CH_4	11.4	14.0	15.1
H_2	36.4	32.8	29.6
N_2	6.5	10.7	21.7
Inerts	12.9	16.9	28.6
Sp. Gr.	.654	.674	.701
Blow	2'	2'-50"	2'-40"
Blow Run	None	10"	20"
Run	4"	4"	4"
Coke	100	100	63
Bituminous Coal			37

Table 4—Effect of Blast Pressure With Air Purge—2-4 Cycle, 7 Sec. Purge—6 ft. Set, Coke

Blast pressure	42"	36"
CO_2	6.1	5.3
Ills.	9.1	8.3
O_2	.8	.8
CO	29.5	30.8
CH_4	13.5	14.0
H_2	30.1	32.0
N_2	10.9	8.8
Inerts	17.8	14.9
Sp. Gr.	.707	.681

Table 5—Composition of Gas Made With and Without Blow Run Using Mixture of Bituminous Coal and Coke

Bitum. Coal	None	40%	43%	48%
Blow	2'	2'	2'	2'-45"
Blow Run	None	None	10"	15"
Run	4'	4'	3'-50"	4'
CO_2	4.5	4.7	5.3	5.0
Ills.	7.8	8.3	8.5	9.1
O_2	.6	.7	.6	.5
CO	34.9	30.8	29.0	30.3
CH_4	12.8	15.8	14.1	14.8
H_2	36.4	36.0	32.5	34.8
N	3.0	3.7	10.0	5.5
Inerts	8.1	9.1	15.9	11.0
Sp. Gr.	.634	.637	.667	.653

Table 6—Composition of Gas Made Using Both Blow Run and Air Purge With 60 Per Cent Bituminous Coal and 40 Per Cent Coke

	Plant A	Plant B
CO_2	4.4	5.8
Ills.	9.8	9.6
O_2	1.0	.4
CO	25.4	26.9
CH_4	15.9	14.1
H_2	27.3	29.2

N_2	16.2	14.0
Inerts	21.6	20.2
Sp. Gr.	.717	.712

12 sec. purge. 15 sec. blow run on up runs. 3-4 cycle air purge and blow run out of blow.

Table 7—Analyses of Blue Gas Made During Last Minute of a 5-Minute Run With and Without a 15-Second Blow Run, With Coke

	Without Blow Run	With 15 sec. Blow Run
CO_2	9.1	6.0
Ills.	0	0
O_2	.1	.3
CO	36.5	41.3
CH_4	.4	2.0
H_2	52.6	49.0
N_2	1.3	1.4

Table 8—Composition of Gas Made During Blow and Blow Run Using a Mixture of Bituminous Coal and Anthracite

(Samples taken from top of generator of a 6 ft. set)

Producer Gas 2 minute blow

Sample:	1	2	3	4	5	6	7	8
CO_2	11.8	13.8	11.5	10.0	11.6	13.0	9.8	13.6
Ills.			.5		.3			
O_2	.2		.7	.1	.2	.8	.5	.4
CO	14.4	13.8	14.8	8.5	4.3		9.4	
CH_4		3.4		2.0	.9			
H_2		2.3	9.1	2.8	2.0			
N_2		68.7	63.4	76.6	80.7			

Sample 1—8th blow after charging Anthracite Coal
Sample 2—2nd blow after charging Anthracite Coal
Sample 3—3rd blow after charging Bituminous Coal
Sample 4—Last blow after charging Anthracite Coal
Sample 5—1st blow after charging Bituminous Coal
Sample 6—5th blow after charging Bituminous Coal
Sample 7—6th blow after charging Anthracite Coal
Sample 8—3rd blow after charging Anthracite Coal

Blow Run Gas. 15 Second Blow Run

Sample:	1	2	3	4	5	6	7
CO_2	5.2	6.5	5.7	3.0	7.0	8.0	4.0
Ills.	.2	.5	.7			.2	
O_2	.2	.4	1.3	.9	1.4	.6	.6
CO	21.1	21.9	22.7	25.3	12.3	17.0	24.5
CH_4	1.9	3.1	3.1	1.0	1.1	1.9	2.5
H_2	9.1	12.5	10.5	16.0	5.2	6.0	8.5
N_2	62.3	55.1	56.0	53.8	73.0	66.3	59.9

Sample 1—2nd blow run after charging Anthracite Coal
Sample 2—1st blow run after charging Bituminous Coal
Sample 3—5th blow run after charging Bituminous Coal
Sample 4—6th blow run after charging Anthracite Coal
Sample 5—3rd blow run after charging Anthracite Coal
Sample 6—Composite of 8 blow runs 60% Bit., 40% Anth. Coal coked in Generator.
Sample 7—Composite of 5 blow runs, 60% Bit., 40% Anth.

Table 9—Composition of Blow Run and Air Purge Gas—Composite Sample of 8 Blow Run and 8 Air Purge Periods Taken from Outlet of Scrubber Back of a 6 ft. Set Coke Used as Generator Fuel

Length	Air Purge 9 seconds	Blow Run 10 seconds
CO_2	10.4	8.0
Ills.	1.2	.3
O_2	.7	.6
CO	22.2	18.9
CH_4	1.8	.4
H_2	32.0	10.8
N_2	31.7	61.0
B.t.u. (Calculated)	221	107

B.t.u. of Illuminants taken as 2250.

Table 10—Composition of Gas Made With Straight Coke, Straight Anthracite, Mixture of Coke and Bituminous Coal, Mixture of Anthracite and Bituminous Coal, Without Blow Run or Air Purge

	Plant A		Plant B	
% Anthracite	100	66		
% Coke			100	60
% Bituminous		34		40
CO_2	3.6	4.4	4.5	4.7
Ills.	9.0	8.6	7.8	8.3
O_2	.5	.8	.6	.7
CO	33.4	31.9	34.9	30.8
CH_4	11.8	12.2	12.8	15.8
H_2	37.1	36.8	36.4	36.0
N_2	4.6	5.3	3.0	3.7
Inerts	8.7	10.5	8.1	9.1
Sp. Gr.	.637	.645	.634	.637

Table 11—Rate of Carbonization of Soft Coal When Used in Water Gas—Samples Taken During Run from Top of Washbox After Charging Soft Coal

Run after coaling / Type of run	1st split	2nd split	3rd split	4th split	5th split	1st up. no oil
CO_2	4.0	4.2	4.6	6.0	4.0	4.4
Ills.	7.8	9.1	13.5	7.6	8.4	1.6
O	.7	1.1	.9	.6	.7	.8
CO	27.9	15.9	16.2	21.9	24.5	31.4
CH_4	19.4	25.8	23.7	20.1	20.2	9.7
H_2	35.8	40.0	30.5	39.6	36.9	47.2
N_2	4.4	3.9	10.6	4.2	5.3	4.9

BROOKLYN UNION HONORS OLD TIMERS

(Continued from page 514)

made me feel welcome. I realize I am a baby in the organization, almost the newest one, but I have been here long enough and have seen enough to make me very proud of this company and my affiliation with you.

"I was asked to give the address of welcome. I can only say that the company is glad to have a meeting for the purpose which brings us together here. Its officers are proud to look into the faces of more than 300 of their associates, every one of

whom has spent not less than 25 years in common effort.

"Gentlemen, let us hope that unitedly, as in the past, you will carry the banner of the company to still greater heights of attainment.

"I congratulate each one of you individually on what you have done, and in closing extend to you my very best wishes."

Honor Men Assemble

At the conclusion of Mr. Paige's address, the honor men marched out on the drill floor, where about 6,000 of their relatives, friends and fellow-workers had assembled to greet them.

Colonel William N. Dykman then took charge of the ceremonies. He introduced Dr. E. J. Cattell, who made a humorous talk to the men, complimenting them on their years of service and congratulating the company upon having such loyal employees.

At the conclusion of Dr. Cattell's address, the presentation of the service emblems took place. Colonel Dykman presented the first emblem to James H. Jourdan, president of the Brooklyn Union Gas Company, who has served more than 40 years with the company. He then presented an emblem to Arthur F. Staniford, vice-president, who has also served more than 40 years.

The surprise of the evening came when Mr. Jourdan presented Colonel Dykman with a service emblem in recognition of his lengthy service as the company's attorney.

Mr. Jourdan then decorated the men who had served for more than 50 years and Mr. Staniford presented the emblems to the men who had served between 25 and 50 years.

After the presentation of the medals the floor was cleared and contnuous dancing was enjoyed by all present.

INTERNAL CORROSION OF HOLDERS

(Continued from page 510)

and in being removed from the surface of the iron it exposes new masses of the metal to the action of corrosive agents.

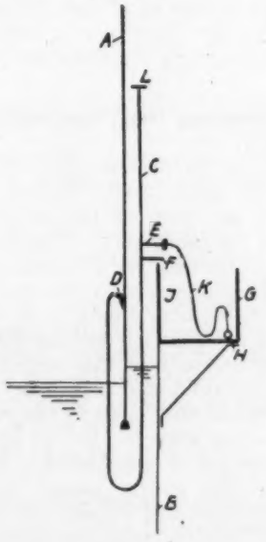
Hydrocyanic acid is also a gas that is found in comparatively small proportions in the coal-water gas mixture or in water gas in the holder, after it has passed through the purification system. But this gas is corrosive and because of its affinity to iron, that is because it forms a complex compound with iron, it is not dangerous. A complex ion is formed and it may be assumed that the ferrous ions that are evolved through electrolytic solution pressure are converted directly into iron cyanids by reaction with hydrocyanic acid, or after it has been first converted into iron sulphide and then reacting with ammina, there may be formed water soluble or water insoluble ferro-cyanides. Hence in this connection the hydrocyanic acid appears to act in the same manner as oxygen, inasmuch as it causes ferrous ions to disappear and in this manner gives rise to a certain solution pressure which results in the emission of more ions by the iron metal.

Carbon Monoxide in the Gas

An important ingredient of mixed gas and water gas is carbon monoxide. Attention must also be paid to this ingredient of the gas, for it possesses corrosive properties. Carbon monoxide forms certain compounds both with iron as well as nickel, which compounds are known as the carbonyls. There are two iron carbonyls according to the formulae, $Fe(CO)_4$ and $Fe(CO)_5$. The formation of these compounds means that the metallic iron is attacked in its elemental state, and both rise in temperature and increase in the pressure have a very favorable action on the mechanism of this reaction.

Protection Against Internal Holder Corrosion

From what has preceded it is evident that there are many different ways in which the constituents of gas can attack metallic iron, and for this reason it follows that it is not an easy matter to select a protective medium which will successfully combat all these corrosive agencies. It is, of course, impossible to remove every last trace of these corrosive substances both from the gas and from the water that is used in the holders, and even if there were some process for accomplishing this, it would not be feasible because of its cost. As far as painting the inside walls of the holders with a good quality of oil or bitumen paint is concerned, this might be done in the case of new holders and good protection would be afforded thereby for a certain length of time any-



way. But it is a fact that the ingredients of the gas would tend to saponify the oils in the paints and it could not be expected that the paint film would last for a very long time when in constant contact with the corrosive ingredients in the gas. Then again it would not be feasible to paint the interiors of

holders which are now in use and which were not painted when they were erected.

However, a substance has been discovered, which has been described in a former issue of the American Gas Journal, which is known as immunol and which is composed of bituminous ingredients which are absolutely unacted upon by chemical reagents. This substance adheres well to the walls of the holder and is used by being poured into the saucers, whereat it floats on the surface of the water in them. The holder in the Stuttgart gas works has been protected with this substance for the past two years and good results have been obtained with its use.

Apparatus for Applying the Protective Medium

The device which is employed for applying this protective medium to the internal walls of the holder is seen in the accompanying figure. The wall of the holder is seen at A, and the water basin is shown at B. A spray tube is seen at C, which is made in the form of a U in such a manner that its arms are of unequal length. This enables the tube to be inserted through the water seal and under the edge of the holder wall so that the shorter end may come in contact with the interior wall surface. This arm of the U tube is provided with a spray nozzle so that the bituminous preparation may be applied to the metal. The spray nozzle is shown at D. A side tube E connects with the pipe C and is used for introducing bitumin preparation. A piece of piping F aids in directing the spray tube properly against the inner surface of the holder walls. G is a platform on which the operator may stand while carrying out this operation. The feed line or the bituminous preparation is seen at H and the pressure tubing K connects the pipe H with the pipe E. A device for handling the U tube C is shown at L.

Applying the Preparation

Before applying the preparation, it is well to wait for a warm day when the holder is rather full so that the water can flow off the sides of the holder and these may be fairly dry. The piping can then be arranged for feeding the bituminous preparation and this may be pumped into the same. The spray nozzle is directed against the wall of the holder and the pressure is such that a strong flow of liquid is obtained. First one-half of the circumference of the holder wall is sprayed, the tubing being led around the same, and when this is done the connections are made on the other side of the holder in the same manner and the job is completed. This takes but a short time. The excess liquid flows down the internal wall surface and collects in the water seal, and then as the holder sinks the upper parts of the wall become coated with the liquid.

Certain Properties of the Preparation

It was found that the bituminous preparation adhered very tenaciously to the walls of the holder. This adhesion is so great that a dry iron plate, which is dipped into water on the surface of which there is a layer of bituminous preparation, is covered with the preparation even when the plate is moved very rapidly through the water mixture. The result is that when the holder rises the greatest part of the protective liquid is drawn along with the wall and only a thin layer of the same remains on the surface of the water seal. There is still another effect of the film of liquid on the water and that is that it tends to prevent the leakage of gas through the water seal. This is an important advantage. Furthermore, the oily preparation covers the walls of the holder and fills up the cracks which are present between the rivet connections and the like so that a film of impervious liquid is formed which prevents the leakage of gas through these fine openings.

THE NEWSPAPER CONTACT

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livered. This is more satisfactory and the public is given better service than it would if the work had to be done in the short space elapsing between the time the speech is made and the newspaper goes to press.

The committee can secure photographs, prepare notes, outline features. It can see that all the papers in a territory get the news instead of only those in the city where the convention is held.

It can assist by suggestion in getting discussion at the convention of subjects in which the general public is interested. Aside from the discussion of technical matters, it can suggest to the program committee that there is apparent an interest on the part of the public in a certain phase of the public utility industry. The committee knows because it keeps in close touch with public sentiment by reading the newspaper carefully and in other ways keeping its finger on the public pulse.

Suggesting Papers and Addresses

The committee suggests that a paper or address on this subject will be read because it is timely. The article is prepared by an expert and authority on the subject and is widely published.

The newspapers appreciate this service.

And the wide publicity given to the discussions of the convention help to impress on the public the importance of the public utilities.

There are consolidations taking place constantly, small systems and isolated plants, publicly or privately owned, being purchased by larger ones. There are millions of dollars being spent for extensions and improvements to extend or improve service. The

committee knows about these or should know of them. It gives them publicity throughout the territory, rather than only in the immediate community where the story breaks. The committee knows that it is better to release this story for afternoon papers at 7 o'clock in the morning when the mechanical machinery of news dissemination is not crowded, rather than at one or two o'clock in the afternoon, just before the papers go to press. If the story is for morning newspapers it should be released late in the afternoon.

This also is service which the newspapers appreciate and the public is the better served.

Correcting Misinformation

The committee can correct misinformation.

There are, fortunately, very few newspapers that want to lie to their readers or be a party to the dissemination of misinformation or a distortion of truth. And the public wants its facts on a subject reported correctly in the first place, rather than waste time listening to a controversy and having to decide on its merits after extended discussion.

The attention of newspapers can be called in a courteous manner to repeated errors on subjects relating to the utilities, and false statements to which the editor has been a party in disseminating. If the committee is right, and it must be or it should not act, it will get a respectful hearing from the editor.

And if irresponsible public speakers know that they are being watched and checked up and that they are not going to be allowed to get away with malicious utterances, they are going to be more careful.

Newspapers and Public Served

The newspapers and the public are again served.

When the newspaper comes to realize the importance of the utilities as sources of news they will want feature material and interesting stories about their operation.

The committee can be of service to the newspaper and the public by offering every facility for securing what is wanted.

The committee also keeps in touch with the newspaper man personally and from him he can learn many things which are not published. There may be a discontent on the part of the public in a community as to some phase of the service of the utility company but the editor may be reluctant to start a controversy because the matter may not yet be of sufficient importance. If close contact with the editors is maintained the committee comes to know of these incidents and by securing their correction by company executives, often prevents the development of a situation which may lead to serious trouble.

The newspaper and the public are again served.

While it is almost universally true that if a committee makes every effort to maintain friendly relations with a newspaper and is fair and honest in its dealings, it can depend on the fairness and integrity of the editor, sometimes it is necessary to fight.

An Example

I have in mind an instance where a certain newspaper maliciously and constantly carried on a fight against its utility company when there was absolutely no warrant for the same. Its very apparent purpose was to gain circulation and prestige through a hypocritical championship of the cause of the people.

Argument and reasoning with the editor being unavailing, the company was finally prevailed on by its Information Committee to go into the advertising columns of that newspaper and fight back.

A series of open letters to the editor were published in his own newspaper, calling attention to his errors, and appealing over his head to the favorable consideration of the readers of the newspaper.

The result was a most striking proof of the power of advertising.

In less than six weeks the editor was the laughing stock of his community and he shut up.

Arbitrary Power of Press

After many years' connection with the newspaper business I am less impressed with the arbitrary power of the press than are many people. This arbitrary power is frequently magnified. Newspapers are the vehicles through which the public learns what is transpiring rather than the makers of public opinion. Of course, there are efficient and non-efficient vehicles just as there are good and better gas engineers.

But the public is not childishly credulous and generally knows how to judge a good newspaper from a poor one. The wise editor, therefore, plays fair with the public. He gives the news and lets the people be the judges.

The service of information committees can be extended to the business office as well as to the editorial department.

Data regarding the extent of service and territory covered can be provided to advertising managers. He is fortified with this material to gain favorable consideration from the manufacturer and his advertising agency when he is trying to sell space to advertising the sale of appliances.

Once again the newspaper and the public are served.

But in all of its dealings the confidence of the newspapers must be held inviolate. Public utilities spend millions of dollars to provide service. They spend more millions to insure themselves against even momentary suspension of service.

It is just as important that they exert equal care that the public confidence which they are gaining is maintained.

This is being done by fair-dealing.

NEWS OF THE GAS INDUSTRY

Gas Metermen's Course to Be Given at Iowa State College

The fifth annual gas metermen's short course or the "overall conference" of Iowa District gas men, will be held at Iowa State College at Ames, December 8 to 11.

This short course annually draws students from over a dozen states in the Middle West. Men who attend are given four days of intensive instruction on the care, structure and maintenance of gas meters. It is known as the overall conference because all students, both executives and shopmen, must come prepared to work in the college shops and receive practical experience in caring for gas meters.

Officials of the Iowa District Gas Association who co-operate with the faculty of the engineering extension department of the State College in staging the course, anticipate a record-breaking attendance this year. Last year one hundred and seventy-five enrolled, representing gas companies from over a dozen states. It is hoped this year to eclipse that mark.

The Iowa District Gas Association comprises the States of Iowa, Minnesota, North and South Dakota and Nebraska.

The tentative program outlined for the course this year follows:

Tuesday, Dec. 8, 1925

8.30-11 A. M.—Registration, Engineering Hall.

11 A. M.—Address of welcome, Prof. D. C. Faber. Outline of course, C. R. Stahl.

11.30 A. M.—Luncheon.

1 P. M.—Sections A and B. First lecture and demonstration, Geo. A. Lane, Wm. Rosenia.

2 P. M.—Section A, shop practice. Section B, paper, "House Governors," Mr. Boyd. Discussion.

5 P. M.—Adjournment.

7.30 P. M.—Smoker, Chamber of Commerce Club Rooms.

Wednesday, Dec. 9, 1925

8.30 A. M.—Sections A and B. Second lecture and demonstration, Geo. A. Lane, Wm. Rosenia. General repairing of tin meters above the table.

9.30 A. M.—Section A, shop practice. Section B, "Gas Department Records," Mr. O. M. Hoxie.

11.30 A. M.—Luncheon.

1 P. M.—Sections A and B. Lecture and demonstration. "First Aid Methods and Resuscitation."

2 P. M.—Sections A and B. Third lecture and demonstration, Mr. Lane and Mr. Rosenia.

3 P. M.—Section A, shop practice. Section B, paper, "Public Relations," Joe Carmichael. Discussion.

Thursday, Dec. 10, 1925

8.30 A. M.—Sections A and B. Lecture and demonstration, E. J. Werthman.

9.30 A. M.—Section A, shop practice on iron meter. Section B, paper, "Making a Pressure Survey," Mr. M. I. Mix.

11.30 A. M.—Luncheon.

1 P. M.—Sections A and B. Lecture and demonstration on the use of fire fighting equipment.

2 P. M.—Sections A and B. Lecture and demonstration, "Final Testing and Adjusting of Ironcase Meter," Mr. Werthman.

3 P. M.—Section A, shop practice. Section B, discussion of various meter problems, including the repairing of leaks on the consumers' premises, Geo. A. Lane. General discussion.

5 P. M.—Adjournment.

7 P. M.—Banquet (Mr. H. H. Ainsworth in charge).

Friday, Dec. 11, 1925

8.30 A. M.—Sections A and B. Lecture and demonstration, Mr. Lane and Mr. Rosenia. Removing front and back, replacing diaphragms, etc.

10 A. M.—Section A, shop practice. Section B, "Care, Handling and Installing Meters," Mr. R. L. Klar, Des Moines.

11.30 A. M.—Luncheon.

1 P. M.—Section A, shop practice. Section B, question box.

5 P. M.—Adjournment.

F. R. Hutchinson Dies in Cleveland

Frank Rockhill Hutchinson was a nationally known authority on gas usage and appliance. Born in Trenton, Mr. Hutchinson moved to Cleveland with his family 14 years ago and soon thereafter became associated with the East Ohio Gas Company. He took charge of the gas appliance department of the company and served in this capacity for several years. Later he entered the field of gas appliance manufacturing and at the time of his death was sales manager of the Independent Register Company, manufacturer of gas appliances.

Prior to going to Cleveland he was associated at various periods with the Public Service Corporation of Trenton, the Atlantic City Gas Company, Atlantic City, and a public utilities company in New York.

By gas appliance manufacturers the nation over he was recognized as an authority, and often was called as counselor to pass judgment on the merits of new inventions and devices.

Charles H. Nettleton Dead

Just as this issue goes to press word has been received of the death of Charles H. Nettleton, president of the New Haven Gas Light Company, New Haven, Conn. Mr. Nettleton died suddenly on October 29 from heart failure. He was well known in the gas industry, having been connected with it since 1871.

Washington Gas Light Co. to Adopt New Accounting System

Washington, D. C.—A new standard accounting system, approved by the National Association of Utility and Railway Commissioners, will be used by the Washington Gas Light Company after January 1, 1927.

Company officials conferred with members of the Public Utilities